

REMARKS

Claims 8-15 and 21-38 are pending in the present application. Applicants submit herewith a Declaration under 37 CFR §1.132. The Reply, including the Declaration, should be entered because the claims have been rejected over the cited references, and despite Applicants' amendments, discussion of and arguments relating to the references and the differences between Applicants' invention and the asserted combination of the references, the Examiner has maintained both his position and the rejections of Applicants' claims. Accordingly, it is now necessary for Applicants to submit the present Declaration setting forth factual evidence to rebut the Examiner's position and to overcome the rejections of Applicants' claims. For this reason, submission of the present Declaration is necessary and could not have previously been submitted. The Examiner is respectfully requested to enter this Reply and the Declaration of Mr. Uriu, and to reconsider and withdraw the rejection of Applicants' claims.

Rejection of Claims 8-15 and 21-28 Under 35 U.S.C. §103(a)

Claims 8-15 and 21-28 stand rejected as obvious over Tashiro et al, U.S. Patent No. 5,515,022 in view of Hirohashi JP 6-112047. Applicants traverse this rejection for at least the following reasons, in addition to the reasons of record, which are incorporated herein by reference.

As noted above, Applicants submit herewith the Declaration of Mr. Eiichi Uriu, one of the inventors of the presently disclosed and claimed invention. The Declaration includes details of experiments conducted by Mr. Uriu to observe the effects of producing conductive patterns by the electroforming process of the present invention and by the printing methods disclosed in Tashiro and Hirohashi. Results of these experiments are also detailed in the Declaration. These results are discussed below in relation to the above described features of the pending claims. These results demonstrate that the present invention would not have been obvious over these two

references, since even if the references would be combined, the presently disclosed and claimed invention would not be obtained.

Thickness and Width to Thickness Ratio

Independent claims 8, 12, 21 and 25 include the feature of the conductive pattern having a thickness of $10\text{ }\mu\text{m}$ or more and a width to thickness ratio from 1 to less than 5. Such a thickness and width to thickness ratio of the conductive pattern of the present invention is a direct result of using an electroforming process as discussed in the Declaration in the last paragraph of section 1.2 and in section 2.2.

That is, as explained in the Declaration, no shrinkage occurs in the electroformed conductive pattern, such that the width of $40\text{ }\mu\text{m}$ and thickness of $20\text{ }\mu\text{m}$ is achieved in the final inductor structure.

On the other hand, the Declaration also shows that the above thickness and width conditions of the conductive pattern cannot be achieved by the printing methods of Tashiro and Hirohashi. That is, as explained in the Declaration, the printed conductive pattern first has a thickness of about $12\text{ }\mu\text{m}$ (which is a practical limit), however after sintering the thickness is reduced by about 40% to about $7\text{ }\mu\text{m}$ due to shrinkage.

Therefore, contrary to the disclosure in Tashiro that a thickness of $5\text{-}50\text{ }\mu\text{m}$ is possible, the declaration clearly shows that this is not the case in practice, where the final thickness is less than $7\text{ }\mu\text{m}$. With a width of about $50\text{ }\mu\text{m}$, the width to thickness ratio of the prior art is about 7 (i.e., $50\text{ }\mu\text{m}/7\text{ }\mu\text{m} \approx 7$). Thus, Tashiro and Hirohashi do not teach or suggest the claimed invention in relation to the thickness ($10\text{ }\mu\text{m}$ or more) and width to thickness ratio (1 to <5) features thereof.

A prerequisite for a case of obviousness is that the Examiner must show that the asserted combination of prior art references teach all of the limitations of the

allegedly obvious claims. In the present case, the Declaration or Mr. Uriu rebuts any such showing.

Accordingly, independent claims 8, 12, 21 and 25, and the claims dependent thereon, would not have been obvious over the asserted combination of Tashiro and Hirohashi, since as shown by the Declaration of Mr. Uriu, even if these references were combined, they do not include all of the limitations of the claimed invention.

No Specific Gap

Independent claims 21, 25, 29 and 34 include the feature of the conductive pattern having no specific gap. In the final Office Action the Examiner contends that the applicant has not specified what is meant by this feature. Applicants respectfully submit that what is meant by this feature would be clear based on the disclosure of the specification. As shown in the following, the present invention results in the formation of no specific gap, but the prior art does result in the formation of a specific gap. This feature distinguishes the claimed invention over the prior art.

Applicants respectfully submit that the Declaration shows what is meant by this term which is used in the specification of the present application. Specifically, the "no specific gap" feature of the present invention is a direct result of using an electroforming process as discussed in the declaration in section 2, and would not be obtained by the methods of the cited references.

That is, as explained in the Declaration in the electroforming process of the present invention no specific gap is formed in the electroformed conductive pattern, since electroforming involves the formation of the pattern by metal plating, without the use of any constituent materials which evaporate as a result of the sintering performed, such that no shrinkage occurs.

On the other hand, the Declaration also shows that in the printing methods of Tashiro and Hirohashi shrinkage of the conductive pattern is caused by the evaporation of the binder resin and the solvent in the conductive paste making up the conductive pattern as a result of the sintering, where this shrinkage results in the formation of a specific gap.

The Declaration further explains that such a specific gap renders the printed conductive pattern susceptible to contaminants, such as water or plating solvent, which may become present in this gap and which can change the characteristics, such as the resistance or impedance, of the printed conductive pattern, therefore changing the characteristics of the inductor formed using this printed conductive pattern.

Therefore, as shown by the facts in the Declaration, even if a specific gap is not shown in the drawings of Tashiro and Hirohashi, such a gap does exist due to the printing methods used by Tashiro and Hirohashi. Thus, Tashiro and Hirohashi also do not teach or suggest the claimed invention in relation to the no specific gap feature thereof.

Accordingly, independent claims 21, 25, 29 and 34, and the claims dependent thereon, would not have been obvious over the asserted combination of Tashiro and Hirohashi, since as shown by the Declaration of Mr. Uriu, even if these references were combined, they do not yield all of the features of the present invention, as specified in these claims.

For the foregoing reasons, Applicants respectfully submit that the presently pending claims patentably distinguish over the cited combination of references. The Examiner is respectfully requested to reconsider and withdraw the rejection of Applicants' claims.

Conclusion

Should the Examiner consider that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below. If any additional fees are required for the filing of these papers, Applicants request the Commissioner to charge those fees to deposit account #18-0988, Docket No. YAMAP0347USB.

Respectfully submitted,
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